

Trend Study 25A-2-99

Study site name: Black Mountain.

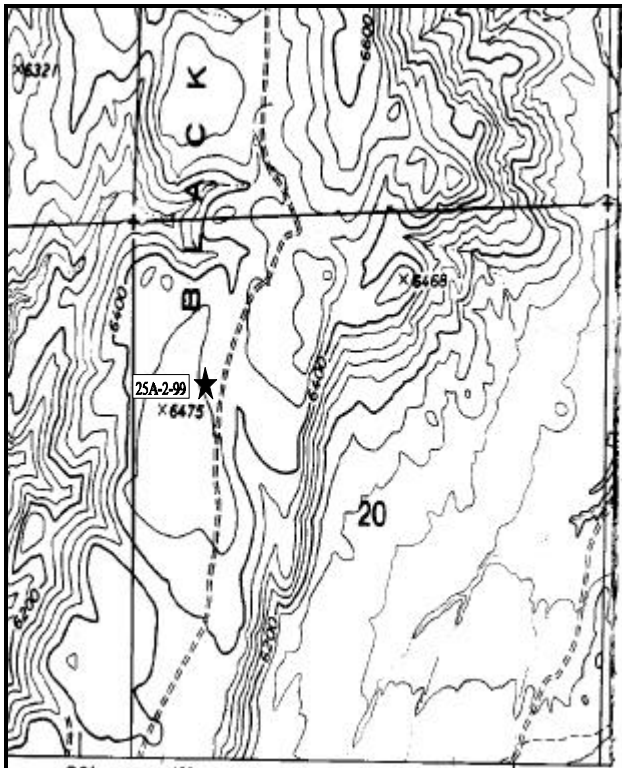
Range type: Chained, Cabled, Seeded P-J.

Compass bearing: frequency baseline 180°M.

Footmark (first frame at) 5 feet, footmarks (frequency belts) line 1 (11 & 95ft), line 2 (34ft), line 3 (59ft), line 4 (71ft).

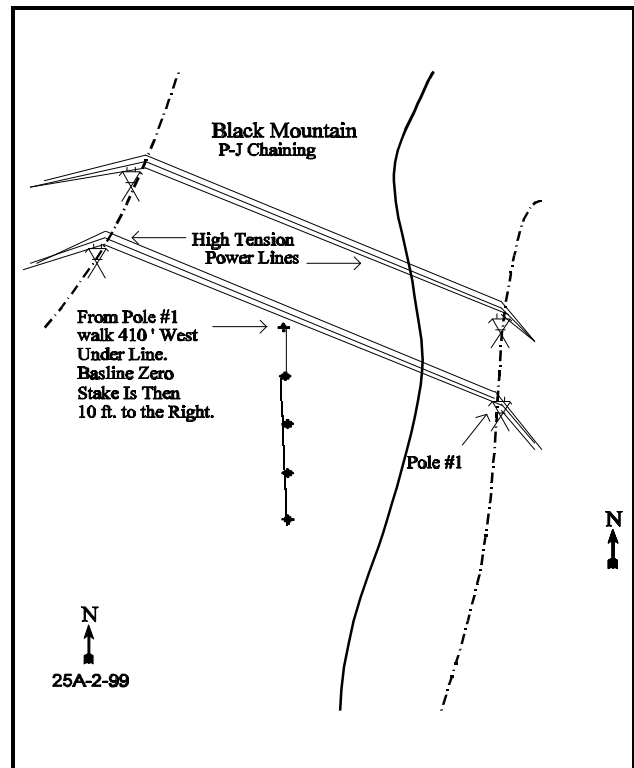
LOCATION DESCRIPTION

From Soldier Canyon Dam #2, proceed 1.85 miles west on the Soldier Canyon Road to the Black Mountain Road. Make a sharp left turn onto this road and travel south-southeast 0.95 miles to a junction. Take the right fork 0.85 miles to the double high-tension powerlines. The transect starts under these lines on the mesa to the right. Continue 1.1 miles beyond the powerlines to a 90-degree fork to the right. Turn right and go 0.55 miles to another fork. Stay to the right and proceed 1.15 miles up the hill and across a chaining until you are between the powerlines. Starting from the pole (#1) east of the road, pace off 410 feet west directly under the lines to the start of the frequency baseline. The 0 foot post is marked with browse tag #7028.



Map Name: Salina, Utah

Township 22S, Range 1E, Section 20



Diagrammatic Sketch

UTM 4303753.249 N, 428084.544 E

DISCUSSION

Trend Study No. 25A-2 (43-2)

The Black Mountain trend study was Ely chained and seeded in 1984. Slope is less than 5% with a slight southern aspect and an elevation of 6,400 feet. The distance to free water (at least 1.5 to 2 miles) has limited livestock use of the area. Cattle have grazed the area for the past 30 or more years, but historically it has had only light to moderate use. Before then, there was heavy pressure from sheep and deer. Cattle now use the area in late spring for about 2 weeks on their way to summer range as part of the Browns Hole allotment. Pellet group data from the site in 1999 estimate 24 cow days use/acre (59 cdu/ha). About half of the cattle pats encountered were recent while the other half were from last season. Use by wildlife is moderate to heavy. Deer use averaged 27 deer days use/acre (68 dd/ha) from 1985 to 1991 on a nearby pellet group transect. Use by deer at the site is currently estimated at 78 deer days use/acre (192 ddu/ha). In the past, elk use has been light most years with three elk days use/hectare being reported in the winter of 1983-84 (Jense et al. 1985). Use by elk is increasing with pellet group transect data in 1999 estimating 38 elk days use/acre (93 edu/ha).

The soil has a sandy clay loam texture with a slightly alkaline pH (7.6). It is moderately shallow with an estimated effective rooting depth under 12 inches. A gravelly layer is present approximately 12 inches below the surface. Organic matter is higher than expected at this site, currently 3.5%. Phosphorus is low at 5.7 ppm where 10 ppm has been shown to be minimal for normal plant growth and development. Bare ground is currently ('99) at 30% cover, which is not excessive for a characteristically dry area that was chained.

The chaining effectively removed the dominant overstory of mature juniper-pinyon and reduced it to widely scattered young trees. Density for juniper is currently ('99) estimated at 72 trees/acre, and pinyon at 23 trees/acre. Browse is more abundant on this site compared to the chaining at Triangle Mountain (#25A-1), but preferred species are still relatively low in density. Black sagebrush is present, which is expected with the shallow soils. The population has remained fairly stable over all sampling years, currently estimated at 860 plants/acre, a 30% increase from 1991. Recruitment from young plants is high at 21%, and percent decadency is low at 5%. Use is light to moderate at the present time. A few mountain big sagebrush plants were sampled in 1999 due to the much larger (more than three times larger) sample now used. This species was included in the seed mix, however this is a marginally dry site for this species. Plants are low in stature and moderately hedged. Stickyleaf low rabbitbrush is the most numerous shrub on the site, currently estimated at 2,200 plants/acre. The current density represents nearly a 4-fold increase since 1991. This species is mostly mature, but has high recruitment at 25% in 1999. This could indicate a possible continued expansion of its population. Use is moderate on this species with 20% displaying moderate use, and an additional 16% showing heavy use. Sixteen percent were classified with poor vigor. It appears that dwarf rabbitbrush (*Chrysothamnus depressus*) was misidentified in 1985 and 1991. All of the rabbitbrush encountered in 1999 were stickyleaf low rabbitbrush (*Chrysothamnus viscidiflorus viscidiflorus*).

Grass composition is dominated by a variety of seeded and native perennial species. Indian ricegrass and bottlebrush squirreltail were the most abundant native perennial grasses. Seeded species such as crested and intermediate wheatgrass, smooth brome, Russian wildrye, and sheep fescue are present, although less abundant than the natives. Most of the perennial species displayed moderate to heavy use in 1999. Cheatgrass, an annual, is now the most common herbaceous species, occurring in 54% of the quadrats and having a sum of nested frequency of 133. It mainly occurs in scattered patches throughout the site.

Forb density and diversity is low. Increasers, annuals or biennials such as Russian thistle and prickly lettuce were most common immediately after the chaining. Since then however, forbs have nearly disappeared from the understory altogether. In 1999, only 4 species were sampled, with pale alyssum, an annual, being the most abundant in cover and frequency. The seeded forbs, alfalfa, small burnet, and yellow sweet clover were not encountered in 1999.

1985 APPARENT TREND ASSESSMENT

Trend will depend upon the success of the Seeding. Any assessment this soon would be tentative at best. However, it would appear that trend of both soils and vegetative composition can only be up.

1991 TREND ASSESSMENT

This site is dryer than the Triangle Mountain site (25A-1) and is evidenced by the slow recovery for most species on this chained site. Most of the seeded grasses are increasing in sum of nested and quadrat frequency values, but it has been slow because of the prolonged drought. The major three native grasses are also increasing in numbers and distribution (bluebunch wheatgrass, Indian ricegrass, and bottlebrush squirreltail). The alfalfa that was seeded has almost disappeared now. The black sagebrush is also showing the effects of the extended drought. It's population has decreased by 40% and percent decadency has increased to 33%. These are not good signs, but with a change in the weather patterns, we would expect the grasses and black sagebrush to recover. Because of these decreases in vegetation, percent bare ground has increased dramatically from 20% to 38%. However, litter cover has remained similar and nested frequency of grasses and forbs have increased.

TREND ASSESSMENT

soil - down slightly, because of the increase in bare ground

browse - down

herbaceous understory - up slightly

1999 TREND ASSESSMENT

Trend for soil is stable, but still in poor condition. Herbaceous vegetation and litter are low for a chained and seeded site due to the shallow soils and extended drought during the mid-90's. Bare ground cover is moderately high at 30% cover, but the gentle slope holds erosion to minimal levels. Trend for browse is stable overall. Black sagebrush, the most numerous preferred species, shows a 30% increase in density, and has high recruitment from young plants at 21%. Percent decadency is low at 5%, with use light to moderate. On a negative note, stickyleaf low rabbitbrush is the most numerous species on the site, increasing by 73% since 1991. It appears that this species will continue to increase with the young age class making up 25% of the population. The herbaceous understory shows a stable trend for grasses, while forbs continue to decline. Perennial forbs are nearly non existent and annual grasses and forbs are increasing. Perennial forbs, primarily the seeded species, have disappeared from the understory altogether. Perennial grasses have remained stable in their sum of nested frequency overall, but show moderate to heavy use.

TREND ASSESSMENT

soil - stable, but in poor condition

browse - stable overall, but poor composition

herbaceous understory - stable

HERBACEOUS TRENDS --

Herd unit 25A, Study no: 2

Type	Species	Nested Frequency			Quadrat Frequency			Average Cover % 09
		'85	'91	'99	'85	'91	'99	
G	Agropyron cristatum	_a 14	_b 57	_b 41	5	29	19	.75
G	Agropyron intermedium	_a 9	_b 88	_a 42	6	36	17	.89
G	Agropyron smithii	_b 4	_a -	_a -	3	-	-	-
G	Agropyron spicatum	_a 5	_b 45	_a 6	2	16	3	.09
G	Bromus inermis	_a 4	_a 6	_b 73	2	5	29	1.20
G	Bromus tectorum (a)	-	-	133	-	-	54	1.31
G	Elymus junceus	_a -	_b 9	_b 12	-	3	6	.11
G	Festuca ovina	_a -	_b 10	_b 27	-	6	11	.37
G	Oryzopsis hymenoides	68	77	95	34	36	38	2.92
G	Poa fendleriana	2	-	6	1	-	2	.06
G	Poa secunda	_a -	_a -	_b 5	-	-	3	.06
G	Sitanion hystrix	_a 49	_b 89	_{ab} 80	28	41	39	1.58
Total for Annual Grasses		0	0	133	0	0	54	1.31
Total for Perennial Grasses		155	381	387	81	172	167	8.06
Total for Grasses		155	381	520	81	172	221	9.38
F	Alyssum alyssoides (a)	-	-	189	-	-	69	.62
F	Antennaria rosea	_b 6	_a -	_a -	4	-	-	-
F	Astragalus spp.	_a 4	_b 30	_a 14	3	16	7	.11
F	Castilleja spp.	-	2	-	-	1	-	-
F	Chaenactis douglasii	_a -	_b 12	_a -	-	6	-	-
F	Cryptantha spp.	-	-	1	-	-	1	.00
F	Erigeron engelmannii	-	2	-	-	1	-	-
F	Eriogonum ovalifolium	_a -	_b 14	_a -	-	6	-	-
F	Lactuca serriola	_a -	_b 7	_a -	-	5	-	-
F	Machaeranthera canescens	-	4	-	-	2	-	-
F	Medicago sativa	_b 14	_a 1	_a -	8	1	-	-
F	Phlox longifolia	_a -	_b 12	_a -	-	6	-	-
F	Salsola iberica (a)	_a 1	_b 19	_a -	1	7	-	-
F	Sanguisorba minor	_b 29	_a 1	_a -	14	1	-	-
F	Senecio multilobatus	3	-	-	1	-	-	-
F	Streptanthus cordatus	2	2	-	1	2	-	-
F	Taraxacum officinale	-	1	-	-	1	-	-
F	Tragopogon dubius	_a -	_{ab} 3	_b 10	-	1	4	.02
F	Unknown forb-perennial	-	2	-	-	1	-	-
Total for Annual Forbs		1	19	189	1	7	69	0.62
Total for Perennial Forbs		58	93	25	31	50	12	0.13
Total for Forbs		59	112	214	32	57	81	0.75

Values with different subscript letters are significantly different at $\alpha = 0.10$ (annuals excluded)

BROWSE TRENDS --

Herd unit 25A, Study no: 2

T y p e	Species	Strip Frequency 09	Average Cover % 09
B	Artemisia nova	26	1.70
B	Artemisia tridentata vaseyana	1	-
B	Chrysothamnus depressus	0	-
B	Chrysothamnus viscidiflorus viscidiflorus	42	2.12
B	Juniperus osteosperma	8	1.83
B	Pinus edulis	1	.03
Total for Browse		78	5.70

BASIC COVER --

Herd unit 25A, Study no: 2

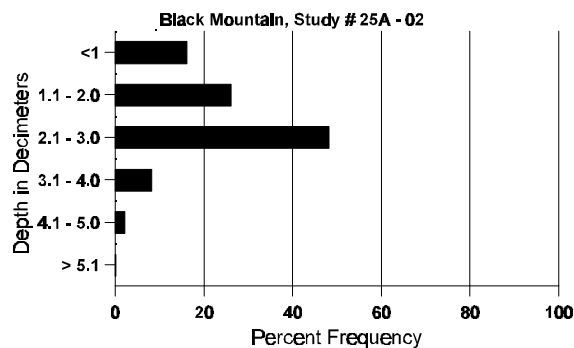
Cover Type	Nested Frequency 09	Average Cover %		
		'85	'91	'99
Vegetation	319	1.50	3.00	18.36
Rock	150	1.75	3.25	4.71
Pavement	311	30.25	14.00	11.60
Litter	312	46.50	42.00	21.79
Cryptogams	7	0	0	.05
Bare Ground	311	20.00	37.75	29.98

SOIL ANALYSIS DATA --

Herd Unit 25A, Study # 02, Study Name: Black Mountain

Effective rooting depth (inches)	Temp °F (depth)	pH	%sand	%silt	%clay	%OM	PPM P	PPM K	dS/m
11.7	56.0 (11.0)	7.6	50.0	25.1	24.9	3.5	5.7	316.8	0.5

Stoniness Index



PELLET GROUP FREQUENCY --

Herd unit 25A, Study no: 2

Type	Quadrat Frequency Ø9	Pellet Transect Days Use/Acre (ha) Ø9
Rabbit	18	n/a
Elk	15	38(94)
Deer	24	78(193)
Cattle	16	24(59)

BROWSE CHARACTERISTICS --

Herd unit 25A, Study no: 2

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Artemisia nova																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	2	7	-	-	-	-	-	-	-	9	-	-	-	180		9	
M	85	13	-	-	-	-	-	-	-	-	13	-	-	-	866	6	7	
	91	6	-	-	-	-	-	-	-	-	6	-	-	-	400	8	11	
	99	23	8	-	1	-	-	-	-	-	32	-	-	-	640	11	18	
D	85	1	1	-	-	-	-	-	-	-	2	-	-	-	133		2	
	91	3	-	-	-	-	-	-	-	-	3	-	-	-	200		3	
	99	-	2	-	-	-	-	-	-	-	2	-	-	-	40		2	
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		07%			00%			00%			-40%							
'91		00%			00%			00%			+30%							
'99		40%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	999	Dec:	13%			
												'91	600		33%			
												'99	860		5%			

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Artemisia tridentata vaseyana																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	2	-	-	-	-	-	-	-	2	-	-	-	40		2	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	13 16	0	
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	60		3	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%										
'99		100%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	-			
												'91	0		-			
												'99	40		-			
Chrysothamnus depressus																		
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	1	-	-	-	-	-	-	-	-	1	-	-	-	66		1	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
M	85	6	-	-	-	-	-	-	-	-	6	-	-	-	400	7 7	6	
	91	3	-	-	-	-	-	-	-	-	3	-	-	-	200	13 14	3	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0	- -	0	
D	85	2	-	-	-	-	-	-	-	-	2	-	-	-	133		2	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%			-50%							
'91		00%			00%			00%										
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	533	Dec:	25%			
												'91	266		0%			
												'99	0		0%			

A G R E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.		Total
		1	2	3	4	5	6	7	8	9	1	2	3	4				
Chrysothamnus viscidiflorus viscidiflorus																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	1	-	-	-	-	-	-	-	-	-	-	-	-	66		1	
	99	-	2	-	-	-	-	-	-	-	-	-	-	-	40		2	
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	4	-	-	-	-	-	-	-	-	-	-	-	-	266		4	
	99	15	12	-	-	-	-	-	-	-	-	-	-	-	540		27	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	91	5	-	-	-	-	-	-	-	-	-	-	-	-	333	15	5	
	99	52	10	18	-	-	-	-	-	-	-	-	18	-	1600	14	80	
D	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	3	-	-	-	-	-	-	-	-	-	-	-	-	60		3	
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	40		2	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%										
'91		00%			00%			00%			+73%							
'99		20%			16%			16%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	0	Dec:	0%			
												'91	599		0%			
												'99	2200		3%			
Juniperus osteosperma																		
S	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	1	-	-	-	-	-	-	-	-	-	-	-	-	20		1	
Y	85	1	-	-	-	-	-	-	-	-	-	-	-	-	66		1	
	91	1	-	-	-	-	-	-	-	-	-	-	-	-	66		1	
	99	6	-	-	-	-	-	-	-	-	-	-	-	-	120		6	
M	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0	-	0	
	99	-	-	-	-	-	-	-	2	-	2	-	-	-	40	-	2	
D	85	1	-	-	-	-	-	-	-	-	-	-	-	-	66		1	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0	
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	160		8	
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>							
'85		00%			00%			00%			-50%							
'91		00%			00%			00%			+59%							
'99		00%			00%			00%										
Total Plants/Acre (excluding Dead & Seedlings)												'85	132	Dec:	50%			
												'91	66		0%			
												'99	160		0%			

A G E	Y R	Form Class (No. of Plants)									Vigor Class				Plants Per Acre	Average (inches) Ht. Cr.	Total
		1	2	3	4	5	6	7	8	9	1	2	3	4			
Pinus edulis																	
Y	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	1	-	-	-	-	-	-	-	-	-	-	-	1	20		1
X	85	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	91	-	-	-	-	-	-	-	-	-	-	-	-	-	0		0
	99	-	-	-	-	-	-	-	-	-	-	-	-	-	40		2
% Plants Showing		<u>Moderate Use</u>			<u>Heavy Use</u>			<u>Poor Vigor</u>			<u>%Change</u>						
		'85			00%			00%			00%						
		'91			00%			00%			00%						
		'99			00%			00%			100%						
Total Plants/Acre (excluding Dead & Seedlings)													'85	0	Dec:	-	
													'91	0		-	
													'99	20		-	